ANGLER HARVEST SURVEY

McINTYRE CREEK 2004

INCLUDING PUMPHOUSE POND & LOUISE (JACKSON) LAKE

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McINTYRE CREEK 2004

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Key Findings

- The lake trout harvest for Louise Lake is well above sustainable limits. Louise Lake gets the highest angler effort per hectare of any lake in Yukon (outside of stocked lakes).
- Sustainability of the harvest of other fish species from Louise Lake and harvests from Pumphouse Pond and McIntyre Creek is largely unknown. Considering the amount of effort and the small size of the system, harvest is likely nearing what is sustainable.
- In 2004, anglers spent a total of 3,190 hours of angling effort over the summer. These results are lower than past survey results (1997).
- The McIntyre Creek system can be broken down into 3 main fisheries with different levels of effort: Pumphouse Pond (36% of the effort, or 1,163 hours), Louise Lake (52%, or 1,671 hours) and various sites on the creek itself (11%, or 356 hours).
- Angler success (or number of fish caught per hour of angling) did not change since the last survey in 1997. All success rates were slightly below Yukon averages.
- Anglers released only 25% of lake trout (found only in Louise Lake). Anglers released a high percentage of all species other than lake trout (67% to 89%).

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Introduction

We conduct angler harvest surveys, also called creel surveys, on a number of Yukon recreational fisheries each year. We use these surveys, together with other fish and fishery-related assessments, to find out if the harvest of fish from the lake is sustainable. Environment Yukon conducts angler harvest surveys on key fisheries either every 5 years or according to angler patterns and management concerns. The results of the surveys directly contribute to management decisions that make sure fisheries are sustainable over the long term.

The fishery we surveyed is called McIntyre Creek following local usage, but this name and other names in this system are in some cases inaccurate. The system of lakes and streams in this area has a long history of water diversion to generate hydro electricity. As a result of the diversions, the names of waters have been, in some cases, misapplied.

The survey covered portions of several small drainages (Figure 1). The highest point of the survey included stretches of Fish Creek, which flows from Fish Lake into Louise Lake. Fish Creek used to flow north into the Ibex valley, but was diverted via a canalized stream so that it now flows into Louise Lake. Water flows from Louise Lake (sometimes known locally as Jackson Lake) through a section of Porter Creek into a headpond for the Yukon Electrical Corporation Limited (YECL) hydro generating facility. From there, water flows into "McIntyre Marsh", some of it via the Icy Waters aquaculture facility. This water then drains into the "Pumphouse Pond" (which is actually a headpond). From Pumphouse Pond, water flows into YECL's second generating station and then into the original McIntyre Creek channel towards the Alaska Highway (along the Fish Lake Road) and eventually the Yukon River.

The survey also covered the portion of McIntyre Creek from Pumphouse Pond to the ponds near Yukon College. We did not include the lower stretches of McIntyre Creek (below Yukon College to its mouth at the Yukon River) in the survey because of sampling limitations. We know that angling activity occurs in these areas.

The survey area is within the limits of the City of Whitehorse and the traditional territories of the Kwanlin Dun and Ta'an Kwach'an First Nations. The survey included most of the popular fishing sites that anglers can quickly and easily reach because of good road access and their closeness to the city. Anglers can fish for a wide variety of species, from popular Arctic grayling and lake trout to non-indigenous species such as Arctic char and rainbow trout. Northern pike and Chinook salmon can be found in the lower reaches. The system provides fishing opportunities for all levels of ability, from areas suitable for those learning to fish to challenging areas for the most experienced angler.

The McIntyre Creek fishery was previously surveyed in 1997. The 2004 survey was done to:

- determine how much time anglers spent fishing (effort);
- understand the fishery's characteristics and patterns of use;
- measure the success rate of anglers;
- compare the level of harvest to the productive capacity;
- record biological information on harvested fish;
- provide anglers with information about regulations; and
- establish a fisheries management presence.

Harvest Regulations

No special angling regulations were in place for the McIntyre Creek system in 2004/2005. General regulations applied to the fishery.

Methods

Survey

In 1990 the Yukon government adopted survey methodology developed by the Ontario Ministry of Natural Resources (Lester and Trippel 1985). A field worker conducts face-to-face interviews with anglers on selected sample days throughout the summer. The worker asks a standard set of questions about the social and biological aspects of the fishery. Data gathered include:

- How much time did anglers spend fishing?
- What fishing methods did anglers use?
- How did anglers fish (boat, shore, etc.)?
- Were anglers guided?
- Where were anglers from?
- What type of visitor were anglers (day users, campers, etc.)?
- What kinds of fish were anglers trying to catch?
- How many fish did anglers catch?
- How many fish did anglers release?

Any other information offered by anglers about their fishing experience is also recorded.

The field worker also collects biological data on the catch of cooperative anglers. Biological data gathered include: length (mm), mass (g), sex, maturity, an aging structure, as well as the collection of stomachs for content analysis in the lab. Any other information about general health and condition of the fish is recorded by the field worker (e.g., abnormalities, disease, lesions).

The field worker subjectively assesses the weather's effect on fishing over the entire sample day (no possible adverse effect, possible adverse effect, definite adverse effect).

The timing of the survey depends on management objectives, key species, and the nature of the fishery. It typically runs from ice out in the spring until either just after Labour Day or the end of September. The goal is to sample at least 20% of the total survey days. The survey is subdivided into several seasonal periods (usually 3 or 4) to better understand changes in angler activity. These periods are further divided into weekends and weekdays. Sample days are allocated to each period while considering both a higher weighting for those periods with the higher projected angler use and a minimum number of samples for each period.

Sample days are 14 hours long, 8:00AM to 10:00PM. On sample days, the field worker interviews all willing anglers. The field worker also records anglers who are observed but not interviewed.

Analysis

When the survey is finished, we enter and analyze the data using the computer program CREESYS (1985) developed by the Ontario Ministry of Natural Resources. The age of sampled fish is determined by counting growth rings on the otolith (a small bone from the fish's head). Diet is determined by examining the stomach contents.

Lake Productivity

The productivity of a lake determines the amount of fish produced annually and can guide how much harvest can be sustained. Estimates of lake productivity are calculated using average lake depth, the concentration of total dissolved solids, and the average annual air temperature at the lake. Ryder's morphoedaphic index (1974) is used and incorporated into Schlesinger and Regier's equation (1982) for calculation of maximum sustained yield (MSY) for all species. Calculation of MSY for individual species is based on partitioning the biomass by species based on the most recent population survey data. Following O'Connor (1982), 15% of MSY provides an "optimum" sustained yield, which maintains high quality fisheries on light to moderately fished lakes.

2004 McIntyre Creek Survey

The survey began on May 15 and ended on September 8, 2004.

We broke the survey into 3 spatial components. For Pumphouse Pond and Louise Lake we used an access survey. The survey technician was stationed at the pond or lake for the entire day, watching fishing activity and interviewing anglers at the end of their fishing trips. For all other angling areas of McIntyre Creek we used a roving survey. The survey technician travelled back and forth through the survey area several times a day, checking all possible areas of angling activity (excluding Pumphouse Pond and Louise Lake) and interviewing anglers. We stopped the roving portion on July 31 because there was not enough angling activity.

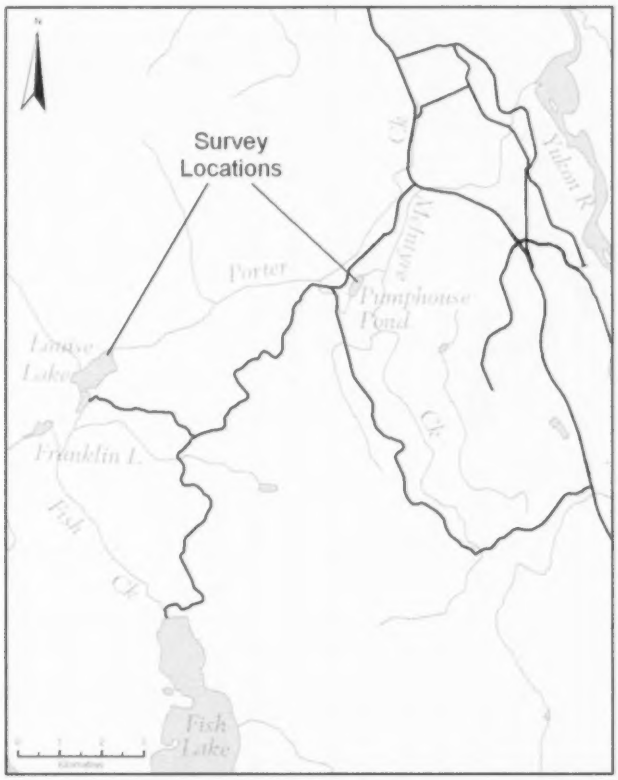

Figure 1. McIntyre Creek system, showing locations of the stationary (access) portions of the 2004 angler harvest survey at Pumphouse Pond and Louise Lake.

**The roving portion of the survey focused on several commonly fished parts of the creek system.

The access surveys of Pumphouse Pond and Louise Lake were each divided into 6 time periods: weekends and weekdays in late May/June, July, and August/early September. The roving survey was done in only 4 of the time periods: weekends and weekdays in late May/June and July. During the 117-day survey period, the field workers sampled on 40 days, giving an overall sampling effort of 34%.

We divided data analysis into two parts. In the first part, we combined data across all 6 time periods. In the second part, we compared results between time periods. All data were analyzed at the party level.

Results

Combined

We combined all 3 spatial components of the survey to estimate total effort and catch for the surveyed areas of the McIntyre Creek system. We also examined the survey results separately for each spatial component.

Effort

We estimate that 3,041 anglers in 1,843 parties fished the McIntyre Creek system in 2004. Anglers spent 1,671 hours on Louise Lake, 1,163 hours on Pumphouse Pond, and 356 hours on the rest of McIntyre Creek, for a total of 3,190 hours of angler effort (fishing time) over the entire summer on the surveyed portion of the McIntyre Creek system. This amount works out to an average of 27.3 angler hours per day, and an average of 1.3 hours per angler.

Catch and Harvest

Table 1 shows the observed number of fish caught and kept by all anglers on sample days on the McIntyre Creek system.

Table 1. Observed angler catch on the McIntyre Creek system, 2004.

Species	# Caught	# Kept
Rainbow trout	193	21
Arctic char	6	2
Lake trout	8	6
Arctic grayling	152	19

Table 2 shows the estimated number of fish caught and kept by all anglers on the McIntyre Creek system for the entire survey. Note that the Arctic char harvest numbers are probably overestimated for the roving portion of the survey.

Table 2. Estimated angler catch on the McIntyre Creek system, 2004.

Species	# Caught	# Kept
Rainbow trout	1657	120
Arctic char	197	181
Lake trout	69	52
Arctic grayling	964	154

Table 3 shows the observed retention rate (percentage of fish caught that were kept) by all anglers on the McIntyre Creek system.

Table 3. Observed retention rate on the McIntyre Creek system, 2004.

Species	Rate
Rainbow trout	11%
Arctic char	33%
Lake trout	75%
Arctic grayling	13%

Pumphouse Pond – All periods combined

Eighteen days were sampled at Pumphouse Pond in the 117 day period from May 15 to September 8. This results in a local sampling effort of 15%.

Effort

There were 225 hours of angler effort observed, which resulted in a total estimated angler effort of 1,163 hours.

Fishing Methods

Spin casting was by far the most dominant method of angling on Pumphouse Pond over the summer (Table 4).

Table 4. Methods of angling at Pumphouse Pond, 2004.

Method	Rate
Still fishing	7%
Jigging	0%
Drift fishing	0%
Trolling	1%
Spin casting	63%
Fly casting	17%
Combinations	11%

Most anglers fished from shore at Pumphouse Pond (Table 5).

Table 5. Modes of angling at Pumphouse Pond, 2004.

Modes	Rate
Canoe	5%
Rowboat	3%
Motorboat	6%
Shore	71%
Bellyboat	10%
Inflatable boat	4%

Guided Anglers

There were no guided angling parties at Pumphouse Pond over the summer.

Angler Origin

Most anglers on Pumphouse Pond over the summer were from Whitehorse (Table 6).

Table 6. Origin of anglers at Pumphouse Pond, 2004.

Origin	Rate
Local	2%
Whitehorse	72%
Yukon	3%
Non-resident Canadians	13%
U.S.	3%
Other (usually Europeans)	6%

Visitor Type

Almost all anglers on Pumphouse Pond were day users (Table 7).

Table 7. Angler user type at Pumphouse Pond, 2004.

User Type	Rate
Day users	98%
Camper – Territorial campground	0%
Camper – Private campground	0%
Camper – Crown Land	2%

Weather

Weather, assessed subjectively over entire sample days as to the degree of deterrence to angling, was quite nice at Pumphouse Pond in 2004 (Table 8).

Table 8. Sample day weather at Pumphouse Pond, 2004.

Did Weather Affect Angling?	Rate
No possible adverse effect	78%
Possible adverse effect	22%
Definite adverse effect	0%

Catch and Harvest

Number of fish observed as caught and kept by all anglers on Pumphouse Pond sample days are presented in Table 9.

Table 9. Observed angler catch at Pumphouse Pond, 2004.

Species	# Caught	# Kept
Rainbow trout	153	17
Arctic char	4	0
Arctic grayling	68	3

Number of fish estimated as caught and kept by all anglers on Pumphouse Pond for the entire survey is presented in Table 10.

Table 10. Estimated angler catch at Pumphouse Pond, 2004.

Species	# Caught	# Kept
Rainbow trout	778	98
Arctic char	16	0
Arctic grayling	315	19

The observed retention rate (percentage of fish caught that were kept) by all anglers on Pumphouse Pond is presented in Table 11.

Table 11. Observed retention rate at Pumphouse Pond, 2004.

Species	Rate
Rainbow trout	11%
Arctic char	0%
Arctic grayling	4%

Fifty-four percent of anglers were targeting rainbow trout, and they were responsible for 99% of the rainbow trout catch and 88% of the rainbow trout harvest. Seven percent of anglers were targeting Arctic grayling and they were responsible for 10% of the Arctic grayling catch and none of the harvest. One percent of anglers were targeting Arctic char and they had no catch or harvest. No other species were targeted over this portion of the survey.

Pumphouse Pond – Comparison between Periods

Effort

Mean daily angler effort was highest in the late May/June and July weekend periods (Figure 2). Mean weekday effort was less than one quarter the weekend effort for all periods. July effort was similar, but there was a drop in effort in the August/late September periods. This decline in effort over the fall period is typical of most Yukon fisheries.

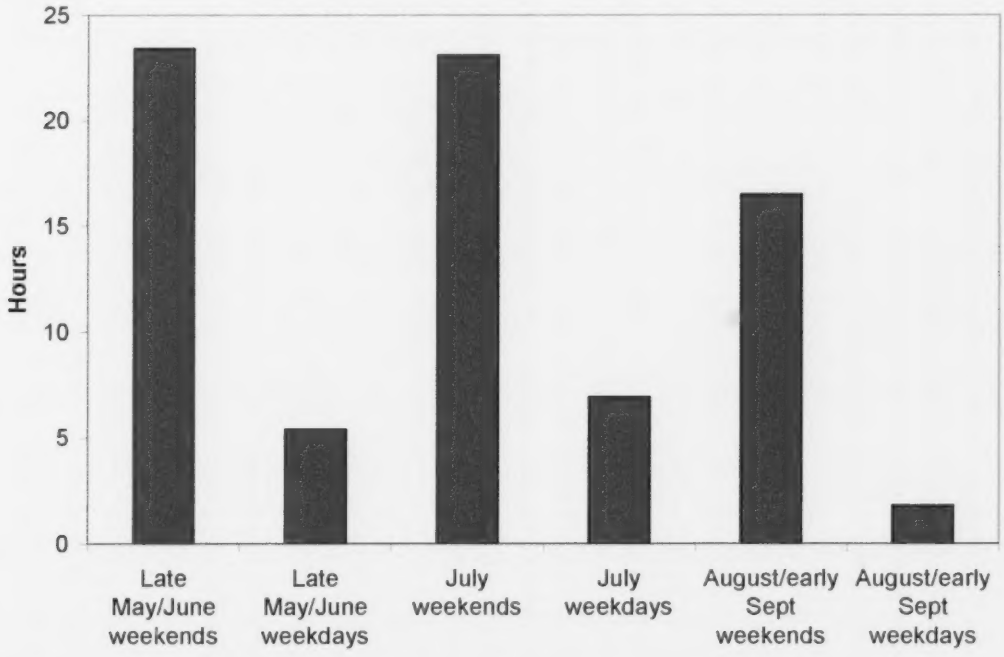

Figure 2. Daily angler effort for Pumphouse Pond, broken down by period (hours of angling per day).

Fishing methods

Fishing methods were consistent between all periods with most people spin casting, some fly fishing, and a few still fishing. A few anglers tried trolling in the late May/June periods.

Guided Anglers

There were no guided parties.

Angler Origin

Origin of anglers was dominated by Whitehorse residents throughout all periods of the summer. Use was heaviest in the early periods, tapering consistently over the summer. Non-resident Canadians were the next heaviest and most consistent users over the summer, also heavier in spring periods then dropping off over the summer. American and European anglers were lightly scattered through all periods, with Europeans being slightly heavier users.

Visitor Type

Day users dominated all strata with a very few Crown land campers on late May/June weekends and August/early September weekends.

Catch

Estimated numbers of fish caught per hour of angling (CPUE) show some interesting patterns. Rainbow trout were angled for in all periods with excellent CPUE, and some especially high levels on late May/June weekdays and both August/late September periods. Arctic char were angled for in 3 periods but only caught in late May/June weekends and August/early September weekends where their CPUE was very low. Arctic grayling CPUE was very low in the spring periods and then reasonably high when they were caught on late May/June and August/early September weekends. These CPUE estimates include time all anglers spent fishing for all species. Anglers who targeted a specific species enjoyed higher success rates than those presented below. CPUE estimates are presented in Table 12.

Table 12. CPUE estimates at Pumphouse Pond, 2004, by period.

Period	Rainbow trout	Arctic char	Arctic grayling
Late May/June weekends	0.55	0.03	0.05
Late May/June weekdays	0.92		0.06
July weekends	0.29		0.51
July weekdays	0.00		
August/early Sept weekends	1.48	0.02	0.80
August/early Sept weekdays	0.92	0.00	

Louise (Jackson) Lake – All Periods Combined

Fourteen days were sampled at Louise Lake in the 117 day period from May 15 to September 8. This results in a local sampling effort of 12%.

Effort

There were 232 hours of angler effort observed, which resulted in a total estimated angler effort of 1,671 hours.

Fishing Methods

Spin casting was by far the dominant method of angling on Louise Lake over the summer Table 13.

Table 13. Methods of angling at Louise Lake, 2004.

Method	Rate
Still fishing	2%
Jigging	2%
Drift fishing	0%
Trolling	6%
Spin casting	68%
Fly casting	15%
Combinations	7%

Most anglers fished from shore at Louise Lake (Table 14).

Table 14. Modes of angling at Louise Lake, 2004.

Modes	Rate
Canoe	11%
Rowboat	0%
Motorboat	9%
Shore	75%
Bellyboat	2%
Inflatable boat	3%
Kayak	1%

Guided Anglers

There were no guided angling parties at Louise Lake over the summer.

Angler Origin

Most anglers on Louise Lake over the summer were from Whitehorse (Table 15).

Table 15. Origin of anglers at Louise Lake, 2004.

Origin	Rate
Local	3%
Whitehorse	82%
Yukon	8%
Non-resident Canadians	6%
U.S.	1%
Other (usually Europeans)	1%

Visitor Type

Nearly all anglers on Louise Lake were day users (Table 16).

Table 16. Angler user type at Louise Lake, 2004.

User Type	Rate
Day users	90%
Camper – Territorial campground	2%
Camper – Private campground	0%
Camper – Crown Land	8%

Weather

Weather, assessed subjectively over entire sample days as to the degree of deterrence to angling, was very nice at Louise Lake in 2004 (Table 17).

Table 17. Sample day weather at Louise Lake, 2004.

Did Weather Affect Angling?	Rate
No possible adverse effect	86%
Possible adverse effect	7%
Definite adverse effect	7%

Catch and Harvest

Number of fish observed as caught and kept by all anglers on Louise Lake sample days is presented in Table 18.

Table 18. Observed angler catch at Louise Lake, 2004.

Species	# Caught	# Kept
Rainbow trout	23	4
Lake trout	8	6
Arctic grayling	84	16

Number of fish estimated as caught and kept by all anglers on Louise Lake for the entire survey is presented in Table 19.

Table 19. Estimated angler catch at Louise Lake, 2004.

Species	# Caught	# Kept
Rainbow trout	170	22
Lake trout	69	52
Arctic grayling	649	135

The observed retention rate (percentage of fish caught that were kept) by all anglers on Louise Lake is presented in Table 20.

Table 20. Observed retention rate at Louise Lake, 2004.

Species	Rate
Rainbow trout	17%
Lake trout	75%
Arctic grayling	19%

Sixteen percent of anglers were targeting rainbow trout, and they were responsible for 52% of the rainbow trout catch and 100% of the rainbow trout harvest. Eleven percent of anglers were targeting lake trout and they were responsible for 75% of the lake trout catch and 67% of the lake trout harvest. Forty-four percent of anglers were targeting Arctic grayling and they were responsible for 69% of the Arctic grayling catch and 63% of the Arctic grayling harvest. No other species were targeted over this portion of the survey.

Louise (Jackson) Lake – Difference Between Periods

Effort

Mean daily angler effort was far higher in the late May/June weekend period than in any other period. July weekends were the next highest at about half the effort, and the remaining periods were all much lower. Mean weekday effort was substantially lower than weekend effort for all periods. Effort in both August/late September periods was very low. Data is presented in Figure 3.

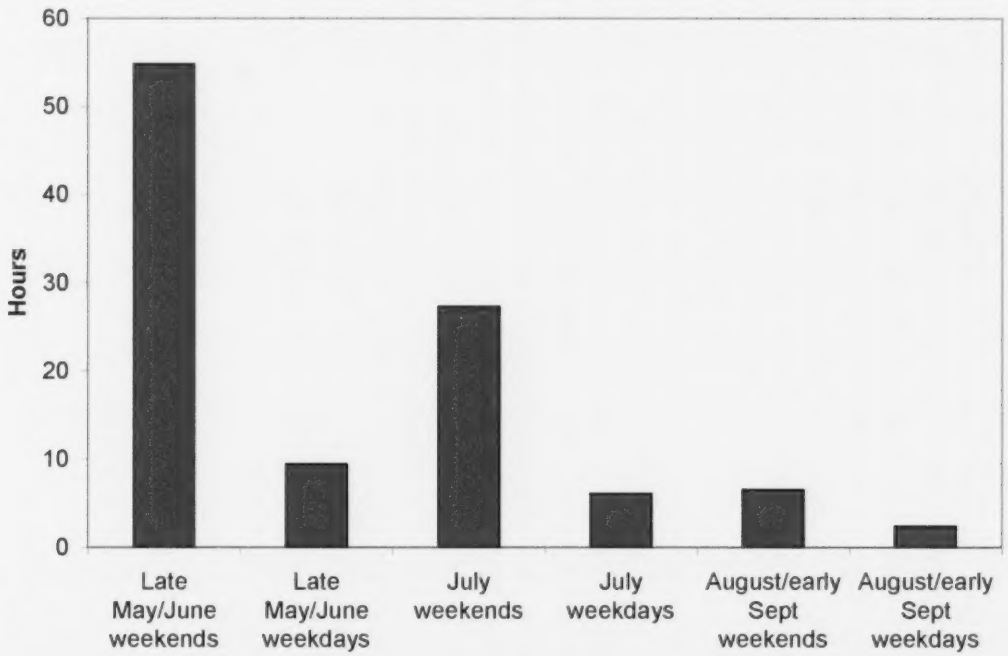

Figure 3. Daily angler effort for Louise Lake in 2004, broken down by period (hours of angling per day).

Fishing Methods

Fishing methods were relatively consistent between all periods with most people spin casting, some fly fishing, and some using combinations of methods. There was a bit of trolling and still fishing and a few anglers tried jigging.

Guided Anglers

There were no guided parties.

Angler Origin

Origin of anglers was dominated by Whitehorse residents throughout all periods of the summer. Use was heaviest in the early periods, tapering consistently over the summer. Other Yukon anglers were the next heaviest users over the summer, appearing in late May/June weekends and July weekdays. Non-resident Canadians and local anglers appeared sporadically and were heaviest in mid-summer periods. American and European anglers only appeared briefly on July weekdays.

Day users dominated all strata with a few Crown land campers in all periods but August/early September.

Catch

Estimated numbers of fish caught per hour of angling (CPUE) was moderate in the early portions of the season and then dropped off over the summer. Rainbow trout were angled for in most periods but CPUE was good only on late May/June weekdays and July weekends. Lake trout were angled for in 3 periods but were caught only in the late May/June periods and with a low CPUE. Arctic grayling were angled in all periods and caught only in late May/June periods and on July weekdays. Arctic grayling CPUE was very good in periods in which they were caught. These CPUE estimates include time all anglers spent fishing for all species. Anglers who targeted a specific species enjoyed higher success rates than those presented below. CPUE estimates are presented in Table 21.

Table 21. CPUE estimates at Louise Lake, 2004, by period.

Period	Rainbow trout	Lake trout	Arctic grayling
Late May/June weekends	0.04	0.05	0.43
Late May/June weekdays	0.26	0.11	0.78
July weekends	0.22	0.00	0.00
July weekdays	0.00		0.49
August/early Sept weekends	0.00		0.00
August/early Sept weekdays			0.00

McIntyre Creek – All Periods Combined

The roving survey routinely visited the 5 to 7 sites where anglers access McIntyre Creek within the survey boundaries. The technician visited each site approximately every 2 hours throughout the sample day. Eight days were sampled on McIntyre Creek in the 78-day period from May 15 to July 31. This results in a sampling effort of 10%.

Effort

There were 5 hours of angler effort observed, which resulted in a total estimated angler effort of 356 hours.

Fishing Methods

There were almost equal numbers of anglers spin casting and fly casting on McIntyre Creek over the summer (Table 22).

Table 22. Methods of angling at McIntyre Creek, 2004.

Method	Rate
Still fishing	0%
Jigging	0%
Drift fishing	0%
Trolling	0%
Spin casting	54%
Fly casting	46%
Combinations	0%

All parties surveyed fished McIntyre Creek from shore.

Guided Anglers

There were no guided angling parties on McIntyre Creek over the summer.

Angler Origin

A majority of the anglers on McIntyre Creek over the summer were from Whitehorse (Table 23).

Table 23. Origin of anglers at McIntyre Creek, 2004.

Origin	Rate
Local	0%
Whitehorse	85%
Yukon	0%
Non-resident Canadians	15%
U.S.	0%
Other (usually Europeans)	0%

All angling parties on McIntyre Creek were day users.

Weather

Weather, assessed subjectively over entire sample days as to the degree of deterrence to angling, was nice at McIntyre Creek in 2004 (Table 24).

Table 24. Sample day weather at McIntyre Creek, 2004.

Did Weather Affect Angling?	Rate
No possible adverse effect	87%
Possible adverse effect	0%
Definite adverse effect	13%

Catch and Harvest

None of the 17 rainbow trout observed caught on sample days was kept. Only 2 Arctic char were observed caught and both were kept.

Over the entire survey, we estimated that 709 rainbow trout and 181 Arctic char were caught. The observed zero retention of rainbow trout biased our estimate of harvest. Similarly, our estimate of Arctic char harvest was likely biased high because there were only 2 observations of Arctic char being caught

and both of these fish were kept. Typical retention rates are around 35%, which would result in an estimated harvest of about 63 Arctic char.

Forty-six percent of anglers were targeting rainbow trout, but they were responsible for none of the rainbow trout catch. Eight percent of anglers were targeting Arctic char and they were responsible for 100% of the Arctic char catch and 100% of the Arctic char harvest. No other species were targeted over this portion of the survey.

McIntyre Creek – Comparisons Between Periods

Effort

Mean daily angler effort was low in all periods. Late May/June weekends and July weekdays were the highest with other periods much lower. Data is presented in Figure 4.

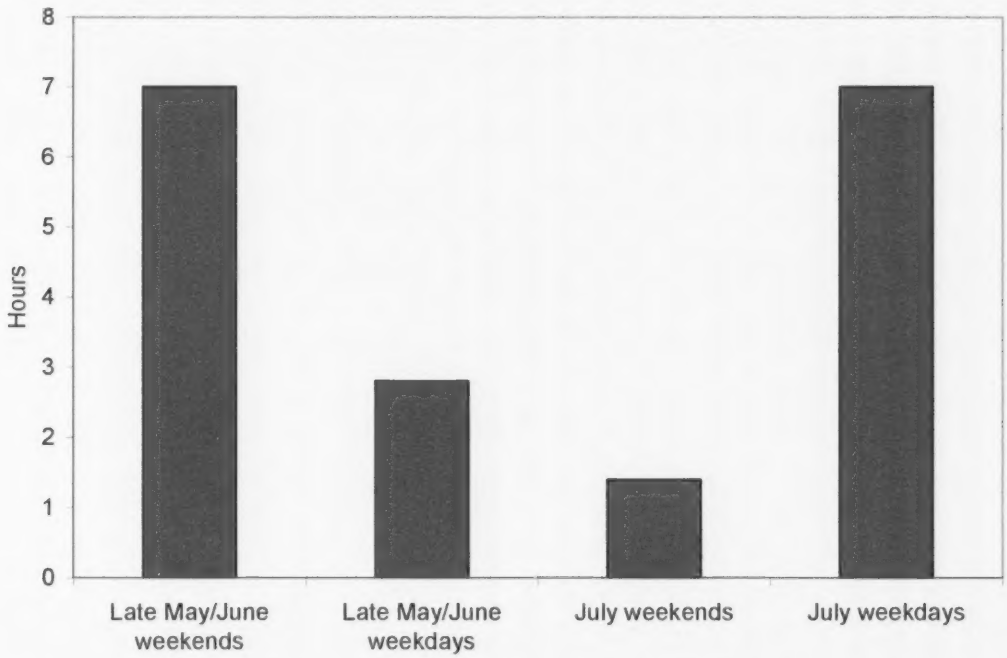

Figure 4. Daily angler effort for Louise Lake in 2004, broken down by period (hours of angling per day).

Fishing Methods

Spin casting and fly fishing were the only methods observed in this portion of the survey. Spin casting was the only method used in the late May/June weekend period, with a split on late May/June weekdays. Fly casting was the

only method on July weekdays, with a dominance of fly casting on July weekdays.

Guided Anglers

There were no guided parties observed on McIntyre Creek in 2004.

Angler Origin

Whitehorse origin anglers dominated all periods of the summer, with a few non-resident Canadians appearing on July weekdays.

Visitor Type

All users observed on McIntyre Creek in 2004 were day users.

Catch

Our estimates of the numbers of fish caught per hour of angling (CPUE) were inconsistent in this portion of the survey because sample sizes were small and success was highly variable (Table 25). A few knowledgeable anglers in specific periods substantially inflated CPUE results. Rainbow trout were only specifically angled for in 2 periods, and caught only on July weekdays, when the CPUE was extremely high. Arctic char were only specifically angled for and caught in one period, and the CPUE was also very high. Angling occurred in all periods, but anglers were just not targeting a specific species or did not catch anything.

Table 25. CPUE estimates at McIntyre Creek, 2004, by period.

Period	Rainbow trout	Arctic char
Late May/June weekends	0.00	
Late May/June weekdays		2.02
July weekends		
July weekdays	4.82	

Comparison Between 2004 and 1997 Surveys

Entire Creek System

An angler harvest survey was carried out on McIntyre Creek in 1997. This survey used similar methods but was designed differently from the 2004 survey. In 1997 we used an access survey full time on Pumphouse Pond and Louise Lake for the first half of the survey period. We then used a roving survey for the entire McIntyre Creek system during the second half of the survey period. The roving survey also included the lower stretches of McIntyre Creek to its confluence with the Yukon River. Results are comparable with an awareness of these provisos.

Appendix 1 shows comparisons with the previous survey by portion of the survey area.

Effort

The estimated angling effort (number of hours) dropped dramatically between surveys on McIntyre Creek. There were an estimated 3,190 hours of effort in 2004, less than half of the 1997 estimate of 6,917 hours. Some of the difference is explained by the fact that the 1997 survey included the lower portion of the creek and its mouth at the Yukon River, which accounted for 6% of the total 1997 effort, or 415 hours.

Fishing Methods

Fishing methods were virtually identical between surveys. Spin casting was by far the most popular method, used by about 70% of anglers, followed by fly casting at about 20% of anglers. The small number of remaining anglers used or combined a variety of other methods.

Guided Anglers

There were no guided parties in 2004 and very few in 1997.

Angler Origin

Most anglers were from Whitehorse. Non-resident Canadians continue to be the second highest users, with few other users (Table 26).

Table 26. Origin of anglers on the McIntyre Creek system, 2004 compared to 1997.

Origin	2004	1997
Local	3%	1%
Whitehorse	77%	82%
Yukon	5%	1%
Non-resident Canadians	10%	8%
U.S.	2%	6%
Other (usually Europeans)	3%	2%

User Type

User types have not varied much between the surveys (Table 27).

Table 27. Angler user type on the McIntyre Creek system, 2004 compared to 1997.

User Type	2004	1997
Day users	94%	91%
Camper – Territorial campground	1%	1%
Camper – Private campground	0%	3%
Camper – Crown land	5%	5%

Weather

Weather from sample days shows that 1997 was a slightly nicer summer than 2004, but weather did not appear to have negatively affected angling effort in either survey year (Table 28).

Table 28. Sample day weather on the McIntyre Creek system, 2004 compared to 1997.

Did Weather Affect Angling?	2004	1997
No possible adverse effect	83%	88%
Possible adverse effect	12%	12%
Definite adverse effect	5%	0%

Catch

Rainbow trout were the most caught species, followed by Arctic grayling and Arctic char (Table 29).

Table 29. Estimated angler catch on the McIntyre Creek system, 2004 compared to 1997.

Species	2004	1997
Chinook salmon	0	62
Rainbow trout	1657	2833
Arctic char	197	306
Lake trout	69	49
Arctic grayling	964	2214
Northern pike	0	44

Harvest

Table 30 shows the estimated numbers harvested, by species, over the entire McIntyre Creek system.

Table 30. Estimated angler harvest on the McIntyre Creek system, 2004 compared to 1997.

Species	2004	1997
Chinook salmon	0	7
Rainbow trout	120	510
Arctic char	181	140
Lake trout	52	49
Arctic grayling	154	518
Northern pike	0	44

Table 31 shows the retention rates (an estimated percentage of fish caught and kept).

Table 31. Estimated retention rate on the McIntyre Creek system, 2004 compared to 1997.

Species	2004	1997
Chinook salmon		11%
Rainbow trout	7%	18%
Arctic char	92%	46%
Lake trout	75%	100%
Arctic grayling	16%	23%
Northern pike		100%

Chinook salmon and northern pike were not reported caught in 2004 because these fish primarily inhabit the lower reaches of McIntyre Creek, which were not surveyed that year.

Rainbow trout continued to be the most frequently caught species in the McIntyre Creek system. However, the estimated number caught in 2004 decreased by 42% from the 1997 catch. The numbers of rainbow trout kept were also much lower in 2004, resulting in a 76% decline in harvest.

Fewer Arctic char were caught in 2004 than 1997 (a 37% reduction). However, because the retention rate doubled, the harvest increased by about 25%. As we noted earlier, our estimate of Arctic char harvest is artificially high because of the small sample size in the roving survey: only 2 fish were observed caught and both were kept. Typical retention rates are around 35%, which would result in a more accurate estimated harvest of about 70 Arctic char. This would be a 50% decline in harvest from 1997.

Lake trout, which are found only in Louise Lake in the McIntyre system, were the only species whose catch and harvest increased. There was a 41% increase in catch (an estimated 69 fish) in 2004. Although fewer fish were kept (100% of lake trout caught in 1997 were harvested), there was a 6% increase in estimated harvest (52 fish).

Arctic grayling was the second most frequently caught species in the McIntyre Creek system. Catches decreased by 56% from 1997 to 2004. The retention rate also declined, leading to a 30% decline in grayling harvest.

Table 32 shows the estimated catch per unit of effort (number of fish caught per angler hour), which is the best indicator of changes in the fishery.

Table 32. Estimated catch per unit of effort on the McIntyre Creek system, 2004 compared to 1997.

Species	2004	1997
Chinook salmon		0.01
Rainbow trout	0.52	0.41
Arctic char	0.06	0.04
Lake trout	0.02	0.01
Arctic grayling	0.30	0.32
Northern pike		0.01

These results show slight increases for all species other than Arctic grayling from 1997 to 2004. The Arctic grayling results are almost identical. Species with limited range in the McIntyre Creek system, such as chinook salmon, northern pike, and lake trout, probably show much higher estimated numbers of fish caught per hour of angling (CPUE) in the immediate areas of

their distribution because the catch result is not being diluted by angling pressure targeting other species in other areas.

Pumphouse Pond, Louise Lake, and McIntyre Creek

Although the 2004 and 1997 surveys were of different design, we are able to subset specific angling locales and loosely compare similar time periods. Although comparisons are not robust, we can better understand site specific variation between surveys.

Effort

Estimated numbers of hours of angler effort for specific portions of each survey are presented in Table 33.

Table 33. Estimated angler effort, 2004 compared to 1997.

Period	Pumphouse Pond	Louise Lake	Entire McIntyre Creek system*
2004 (all season)	1,163	1,671	3.190
2004 (July 1 – Sept 8)	638	547	-
2004 (May 15 – July 31)	-	-	2,783
1997 (all season)	-	-	6,917
1997 (May 15 - July 15)	-	-	5,927
1997 (July 16 - Sept 2)	722	267	-

*Includes Pumphouse Pond and Louise Lake

These subsets show that for Pumphouse Pond in 2004 there was a roughly even split in angling effort between the first and second half of the season. This data is not available for 1997.

For Louise Lake in 2004 about two-thirds of the angling effort took place in the first half of the season. Again this data is not available for 1997.

The entire McIntyre Creek system showed remarkable similarity in both survey years, with 86% of the angling effort occurring in the first half of both seasons. This may be partially explained by the fact that the roving portion of both surveys were ended in mid to end of July, but in both cases this decision was based on the lack of angler effort taking place on the system by that point of the summer.

Catch and Harvest - Pumphouse Pond (late summer)

During the second half of the season catch numbers for all species except Arctic char increased in 2004 but harvest numbers declined because more fish were released. The higher numbers of fish caught in 2004 were caught with less effort than in 1997, resulting in improved CPUE statistics (Table 34).

Catch and Harvest - Louise Lake (late summer)

Second half of the seasons catch numbers for all species declined slightly in 2004. Harvest numbers declined for Arctic grayling but increased for rainbow trout, although harvest of both species was minimal (Table 35). Both years' survey data show that most of the effort and fish catch and harvest on Louise Lake takes place in the first half of the summer. CPUE statistics indicate that fishing in the second half of the summer was poorer in 2004 than in 1997, and may be poorer over the entire season.

Catch and Harvest - McIntyre Creek – All locations (early summer)

Due to the type of analysis conducted on the roving creel data, we were unable to separate out other popular angling locations of McIntyre Creek. We were able to lump the early summer portions of Pumphouse Pond and Louise Lake into the roving data for 2004 to compare with 1997 data (Table 36).

During the first half of the season catch numbers for all species except lake trout declined dramatically in 2004. Lake trout catch showed a slight increase. Harvest numbers also correspondingly declined for all species other than lake trout, which increased only very slightly. Both years' survey data show that most of the effort, catch, and harvest on the McIntyre Creek system takes place in the first half of the summer. CPUE statistics indicate that overall fishing success was similar between the first and second halves of summer in both survey years, despite most of the effort taking place in the first half. It appears that 2004 angling success is unchanged to slightly improved over 1997 for all species but Arctic grayling, which demonstrated a very slight decline.

Table 34. Estimated number of fish caught and harvested in Pumphouse Pond, 2004 compared to 1997.

Species	2004 (All Seasons)			2004 (July 1 – Sept 8)			1997 (July 16 – Sept 2)		
	Caught	Kept	CPUE	Caught	Kept	CPUE	Caught	Kept	CPUE
Rainbow trout	778	98	0.67	426	58	0.67	332	81	0.46
Arctic char	16	0	0.01	4	0	0.01	10	3	0.01
Arctic grayling	315	19	0.27	288	4	0.45	135	25	0.19

Table 35. Estimated number of fish caught and harvested in Louise Lake, 2004 compared to 1997.

Species	2004 (All Seasons)			2004 (July 1 – Sept 8)			1997 (July 16 – Sept 2)		
	Caught	Kept	CPUE	Caught	Kept	CPUE	Caught	Kept	CPUE
Rainbow trout	170	22	0.10	59	16	0.11	83	0	0.31
Lake trout	69	52	0.04	0	0		0	0	
Arctic grayling	649	135	0.39	63	0	0.12	79	6	0.30

Table 36. Estimated number of fish caught (and harvested) by species in McIntyre Creek system (including Pumphouse Pond and Louise Lake), 2004 compared to 1997.

Species	2004 (All Season)			2004 (May 15 – July 31)			1997 (All Season)			1997 (May 15 – July 15)		
	Caught	Kept	CPUE	Caught	Kept	CPUE	Caught	Kept	CPUE	Caught	Kept	CPUE
Chinook salmon							62	7	0.01	62	7	0.01
Rainbow trout	1657	120	0.52	1297	72	0.47	2833	510	0.41	2418	430	0.41
Arctic char	197	181	0.06	192	181	0.07	306	140	0.04	296	137	0.05
Lake trout	69	52	0.02	68	52	0.02	49	49	0.01	49	49	0.01
Arctic grayling	964	154	0.30	794	150	0.29	2214	518	0.32	2001	487	0.34
Northern pike							44	44	0.01	44	44	0.01

Fishery Sustainability

We use estimates of lake productivity (see Methods – Lake Productivity) to establish sustainable levels of harvest (in kilograms) which should maintain quality fisheries. These estimates are generally made for lake trout and there is more uncertainty when considering other species. The average weights of fish captured from each waterbody are used to estimate total summer harvest in kilograms which is compared to estimates of sustainable yield. All harvest estimates are considered minimum estimates as harvest from spring, fall, winter and subsistence fisheries are not included.

We do not have productivity estimates for McIntyre Creek or Pumphouse Pond, therefore sustainable harvest levels are not known. Physical and chemical water data from Pumphouse Pond suggest that it is quite productive, but its small size limits the amount of fish production. The 2004 summer harvest estimate for Pumphouse Pond was 6 kg of Arctic grayling. An ice fishery is known to occur here, but winter harvest levels are not known.

Productivity estimates for Louise Lake indicate that the lake could sustain a total annual lake trout harvest of about 10 kg while maintaining a high quality fishery. Maximum sustainable annual harvest would be about 60 kg of lake trout. The 2004 estimated summer harvest of lake trout for Louise Lake is 43 kg. This is cause for concern as values are well above optimal sustainable levels for maintaining quality angling and may be approaching unsustainable levels over the long term. Again, we have not included any other forms of harvest such as ice fishing, which only increase the possibility of exceeding sustainable harvest levels. On an area-weighted basis, Louise Lake received 25.7 hours of angling per hectare over the summer. This is by far the highest angling effort for any non-stocked lake in the Yukon.

The 2004 estimated summer harvest for Louise Lake of 43 kg of Arctic grayling may also be nearing sustainable harvest thresholds. Without knowledge of harvest for other seasons of the year, the likelihood of exceeding optimal harvest limits for this species is also increased.

We also estimate the 2004 summer harvest of rainbow trout in the system to be 38 kg from Pumphouse Pond and 7 kg from Louise Lake. Estimated kilograms of summer harvest of Arctic char are unavailable due to data deficiencies. An ice fishery is known to occur, but winter harvests levels are not known. As rainbow trout and Arctic char are introduced species in the system, sustainability of their harvest is of limited management concern.

Conclusions

Angling effort (number of hours) on the McIntyre Creek system in 2004 was dramatically lower than in 1997, with a total estimate of 3,190 angler hours. We do not know the reason for this drop. Both summers had nice weather and the fishing success for all species was the same or slightly improved in 2004.

Angler origins, types, methods of angling, and use patterns were very similar between the 2004 and 1997 surveys. Whitehorse anglers were by far the heaviest users, and most anglers spin cast.

Numbers of fish caught for all species were down more or less in line with the decrease in effort. The only exception was lake trout (only found in Louise Lake) which saw a moderate increase. Harvest was in many cases slightly lower as anglers released more of their catch in 2004. Arctic char was the exception, with a larger number kept. However, their catch was very low and in only two locations, indicating that there are fewer char in the system. Our estimate here is likely biased due to a small sample size.

The McIntyre Creek system can be broken down into 3 main fisheries: Pumphouse Pond (1,163 hours or 36%), Louise Lake (1,671 hours or 52%), and various parts of the creek itself (356 hours or 11%).

The angling effort on Pumphouse Pond was similar between surveys and consistent over the summer. Angler success in 2004 was higher than in 1997 for both rainbow trout and Arctic grayling. Angler success was lower for Arctic char in 2004 than in 1997, although few were caught in either year.

The angling effort on Louise Lake was higher in 2004 than in 1997, with about two-thirds of the effort taking place in the first half of the summer. Angler success in 2004 was much lower than 1997 for both rainbow trout and Arctic grayling in the second half of the summer, with no lake trout caught in this period in either survey. Summer-long angler success shows that Arctic grayling success is probably similar between surveys. Rainbow trout success was very slightly lower in 2004 compared to 1997. We do not know lake trout results for Louise Lake in 1997, but overall data show it is probably similar between 2004 and 1997 and below the average success rate for lake trout in Yukon of 0.14 lake trout per hour.

We could not make direct comparisons between the two surveys for other parts of the McIntyre Creek system. However, we did compare the entire system, including Pumphouse Pond and Louise Lake, over the first half of the summer. In both years 86% of the entire summer angler effort took place by the middle to end of July. Overall angler effort in 2004 was down by half from 1997, and catches were accordingly lower for all species except lake trout. The catch of lake trout (only found in Louise Lake) increased moderately. In most cases harvest was slightly lower than catch in 2004 because anglers released more of their catch than in 1997.

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APPENDIX 1. Biological Data

Pumphouse Pond 2004 Biological Data

Rainbow trout

We sampled 13 rainbow trout for biological data at Pumphouse Pond over the survey. Mean fork length was 309 mm and mean weight was 392 g, for a condition factor of 1.33.

We aged 7 of these rainbow trout. These fish were young; the youngest fish was 3 years old, the oldest was 5 and the average age was 3.9 years.

The estimated weight of rainbow trout harvested from Pumphouse Pond by anglers over the summer (harvest estimate x mean weight) was 36 kg.

Chironomids were the most common food of the 10 rainbow trout stomachs we sampled from Pumphouse Pond (Table 1.1).

Table 1.1. Rainbow trout stomach contents, Pumphouse Pond 2004.

Stomach Contents	Proportion
Chironomids (non-biting midges)	71%
Gyraulus (snails)	26%
Trichoptera (caddisflies)	2%
Pelecypoda (freshwater clams / mussels)	Trace
Gammarus (scuds, freshwater shrimp)	Trace

Arctic char

We didn't sample any Arctic char for biological data at Pumphouse Pond.

Arctic grayling

There was 1 Arctic grayling sampled for biological data at Pumphouse Pond over the survey. It was 285 mm long, weighed 300 g, had a condition factor of 1.30, and was 3 years old.

The estimated weight of Arctic grayling harvested from Pumphouse Pond by anglers over the summer (harvest estimate x mean weight) was 6 kg.

Content analysis on the Arctic grayling stomach found 100% Chironomids (non-biting midges).

Louise Lake 2004 Biological Data

Rainbow trout

We sampled 4 rainbow trout from Louise Lake. Mean fork length was 286 mm and mean weight was 334 g. This results in a condition factor of 1.42.

Age data is available for 2 of the sampled rainbow trout from Louise Lake. These fish are very young, with one at 2 years of age and the other at 3 years of age.

Estimated weight of rainbow trout harvested from Louise Lake by anglers over the summer (harvest estimate x mean weight) was 7 kg.

Content analysis was conducted on 3 rainbow trout stomachs from Louise Lake (Table 1.2).

Table 1.2. Rainbow trout stomach contents, Louise Lake 2004.

Stomach Contents	Proportion
Chironomids (non-biting midges)	48%
Unidentified fish	48%
Simuliidae (black flies)	3%
Nematomorpha (horsetail worms)	2%

Lake trout

We sampled 6 lake trout from Louise Lake over the survey. Mean fork length was 404 mm and mean weight was 833 g. This results in a condition factor of 1.26.

Age data is available for 3 of the sampled lake trout from Louise Lake. These fish were 6, 7, and 11 years of age.

Estimated weight of lake trout harvested from Louise Lake by anglers over the summer (harvest estimate x mean weight) was 43 kg.

Content analysis was conducted on 6 lake trout stomachs from Louise Lake (Table 1.3).

Table 1.3. Lake trout stomach contents, Louise Lake 2004.

Stomach Content	Rate
Gammarus (scuds, freshwater shrimp)	80%
Corixidae (waterboatmen)	20%

Arctic grayling

We sampled 13 Arctic grayling from Louise Lake. Mean fork length was 295 mm and mean weight was 315 g. This results in a condition factor of 1.22.

Age data is available for 5 of the sampled Arctic grayling from Louise Lake. These fish averaged 4.2 years of age, with the youngest fish aged at 3 years and the oldest at 5.

Estimated weight of Arctic grayling harvested from Louise Lake by anglers over the summer (harvest estimate x mean weight) was 43 kg.

Content analysis was conducted on 11 Arctic grayling stomachs from Louise Lake (Table 1.4).

Table 1.4. Arctic grayling stomach contents, Louise Lake 2004.

Stomach Contents	Proportion
Trichoptera (caddisflies)	59%
Chironomids (non-biting midges)	21%
Coleoptera (beetles)	9%
Ceratopogonidae (no-see-ums)	3%
Slimy Sculpin	2%
Ephemeroptera (mayflies)	2%
Simuliidae (black flies)	2%
Haliplidae (crawling water beetles)	1%
Unidentified vegetation	Trace
Corixidae (waterboatmen)	Trace
Hymenoptera (wasps)	Trace

McIntyre Creek 2004 Biological Data (Copper Haul Road Crossing)

Arctic char

We sampled 2 Arctic char from the McIntyre Creek crossing of the Copper Haul Road during the roving portion of the survey. They had fork lengths of 270 and 370 mm and had already been cleaned by the angler, so weights and condition factors were not available.

These sampled Arctic char from McIntyre Creek were 3 and 6 years of age.

Estimated weight of Arctic char harvested from McIntyre Creek by anglers over the summer (harvest estimate x mean weight) is not available due to absence of weights from sampled fish.

There were no Arctic char stomachs available for content analysis from McIntyre Creek as sampled fish had already been cleaned by the angler.